R E P O R T R E S U M E S

ED 017 479 SE 004 354

SCIENCE POLICY BULLETIN NUMBER 1.

BY- BRAINARD, ROBERT W.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO

PUB DATE OCT 67

EDRS PRICE MF-$0.25 HC-$1.48 35P.

DESCRIPTORS- *BIBLIOGRAPHIES, *ENGINEERING, *FINANCIAL SUPPORT, *HIGHER EDUCATION, *POLICY FORMATION, *RESEARCH, *SCIENTIFIC RESEARCH, SCIENCES, *SOCIAL CHANGE, *TECHNOLOGY, ADULT EDUCATION, ANNOTATED BIBLIOGRAPHIES, CONSERVATION EDUCATION, DEVELOPING NATIONS, GRANTS, INTERNATIONAL PROGRAMS, INTERAGENCY COOPERATION, MANAGEMENT, NATURAL RESOURCES, PUBLIC HEALTH,

THIS BULLETIN, PUBLISHED BIMONTHLY, REPORTS THE CURRENT LITERATURE IN THE AREA OF SCIENCE AND PUBLIC POLICY. THE COVERAGE ENCOMPASSES BOTH "POLICY FOR SCIENCE" AND "SCIENCE FOR POLICY" MATTERS. SCIENCE IS USED TO DENOTE ENGINEERING, TECHNOLOGY, AND SCIENCE. THE BULLETIN IS INTENDED FOR PERSONS ENGAGED IN STUDYING, FORMULATING, OR IMPLEMENTING PUBLIC POLICY RELATING TO SCIENCE AND ITS USE. ITS PURPOSE IS TO AID SUCH INDIVIDUALS BY ALERTING THEM TO NEW ADDITIONS TO THE SCIENCE POLICY LITERATURE. THE INFORMATION PRESENTED CONSISTS PRINCIPALLY OF A BIBLIOGRAPHIC, PARTIALLY-ANNOTATED LISTING OF CURRENT PUBLICATIONS IN THE AREA. PUBLICATIONS OF A HIGHLY TECHNICAL AND NARROWLY SPECIALIZED NATURE ARE EXCLUDED. THE BIBLIOGRAPHIC INFORMATION IS PRESENTED UNDER A NUMBER OF TOPICAL CATEGORIES WHICH ARE (1) GENERAL, (2) SCIENCE, DOMESTIC PROBLEMS, AND NATIONAL GOALS, (3) NEEDS AND ALLOCATION OF RESOURCES FOR SCIENCE, (4) NATIONAL R AND D PROGRAMS, (5) SCIENCE, EDUCATION, AND THE UNIVERSITY, (6) SCIENCE MANAGEMENT AND POLICY MAKING BODIES, (7) SCIENCE, FOREIGN AFFAIRS, AND NATIONAL DEFENSE, AND (8) SCIENCE POLICY IN FOREIGN COUNTRIES. EACH CITED PUBLICATION IS RECORDED ONLY UNDER A SINGLE CATEGORY. THE NUMBERING OF PUBLICATIONS UNDER EACH CATEGORY RUNS CONSECUTIVELY THROUGH ALL ISSUES OF THE BULLETIN, SO THAT A GIVEN NUMBER REFERS TO ONLY ONE CITATION. MAJOR MEETINGS AND OTHER EVENTS IN THE SUBJECT AREA ARE ALSO REPORTED. (DS)

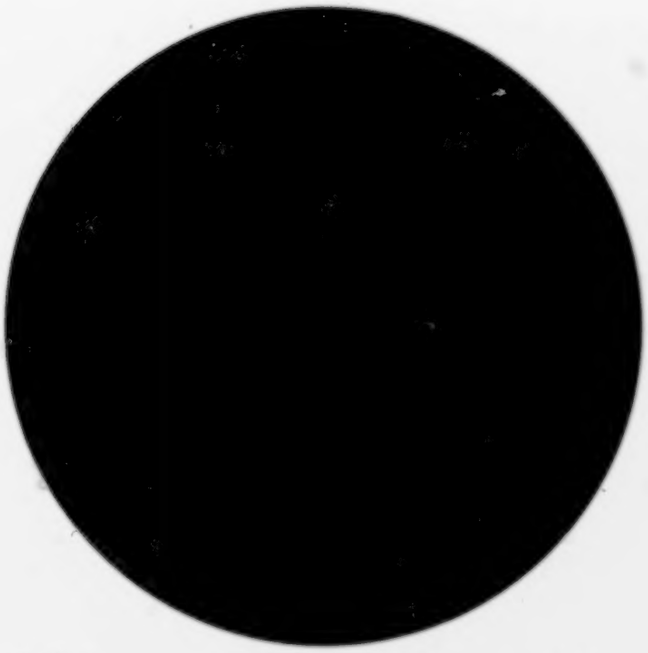
ED017479

4354

Number 1
October 1967

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.



Science Policy Bulletin

Battelle Memorial Institute
Columbus Laboratories

SE004 354

SCIENCE POLICY BULLETIN

The Bulletin, published bimonthly, reports the current literature in the area of science and public policy. The coverage encompasses both "policy for science" and "science for policy" matters. For brevity, "science" is used to denote engineering, technology, and science.

The Bulletin is intended for individuals engaged in studying, formulating, or implementing public policy relating to science and its use. The purpose of the Bulletin is to aid such individuals by alerting them to new additions to the science policy literature.

The information presented in the Bulletin consists principally of a bibliographic listing of current publications in the area. In addition, major meetings and other events in the subject area are reported.

The bibliography, although covering a broad topical scope, is selective in that publications of a highly technical and narrowly specialized nature are excluded.

The bibliographic information is presented under a number of topical categories. Each cited publication is recorded under a single category; cross indexing is not used. The numbering of publications under each category runs consecutively through all issues of the Bulletin, so that a given number refers to only one citation.

Copies of the listed publications are not available through Battelle but can normally be obtained from the originating agency.

The contribution of information to the Bulletin as well as suggestions and comments on its content, coverage, and format are solicited. All correspondence should be addressed to:

BATTELLE MEMORIAL INSTITUTE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Attention: Dr. Robert W. Brainard

TABLE OF CONTENTS

ITEMS OF SPECIAL INTEREST 1

BIBLIOGRAPHY

I. GENERAL. 2

II. SCIENCE, DOMESTIC PROBLEMS AND NATIONAL GOALS. 7

III. NEEDS AND ALLOCATION OF RESOURCES FOR SCIENCE. 11

IV. NATIONAL R&D PROGRAMS. 14

V. SCIENCE, EDUCATION AND THE UNIVERSITY. 17

VI. SCIENCE MANAGEMENT AND POLICY-MAKING BODIES. 20

VII. SCIENCE, FOREIGN AFFAIRS AND NATIONAL DEFENSE. 24

VIII. SCIENCE POLICY IN FOREIGN COUNTRIES. 28

ITEMS OF SPECIAL INTEREST

Three symposia on Science and Public Policy are planned for the 1967 Annual Meeting of the American Association for the Advancement of Science:

Allocation of Resources For Science
Charles V. Kidd (Federal Council for Science and Technology)

Science and Technology as Instruments of Policy
Sanford Lakoff (State University of New York at Stony Brook)

Workshop on Science and Public Policy
Eugene B. Skolnikoff (Massachusetts Institute of Technology)

* * *

An international symposium on "Decision Making in National Science Policy" was held in Great Britain, under the auspices of the Ciba Foundation and the Science of Science Foundation. The program of the symposium included:

The Problem Stated
A. M. Weinberg: The Philosophy and Practice of Allocations for Science
A. E. Pannenberg: Decision Making on Research Policy at Industrial Level

Techniques for Evaluating Research Productivity
J. B. Adams: Putting the Right Questions
C. D. Foster: Cost-Benefit Analysis in Research
R. L. Ackoff: Operations Research and National Science Policy

Scientific Policy Making in Mixed Economics
M. J. Saint-Geours: France
B. A. Rexed: Sweden
W. Carey: USA

Scientific Policy Making in Planned Economics
A. Szalai: Hungary
G. M. Dobrov: USSR

Scientific Policy Making in Post-War Developing Economics
R. L. Cardon: Argentina
A. Rahmun: India
A. Shimshoni: Israel

The proceedings are planned to be published in January 1968, by Messrs. W & A Churchill, London.

BIBLIOGRAPHY

I GENERAL

1. "Applied Science and Technological Progress", U. S. House of Representatives, Washington, D. C., June 1967, a Report to the Committee on Science and Astronautics by the National Academy of Sciences, 434 pp.

   A heterogeneous collection of 17 essays prepared by noted scientists and engineers on various facets of applied research. The report, modeled after the 1965 report "Basic Research and National Goals", presents some general conclusions and recommendations regarding "(1) the nature and strategy of applied research, (2) the environment and institutions in which applied research is carried out, (3) the individual scientist, and (4) the role of the Federal Government."

2. "Battelle Establishes a New 'Think Center'", Scientific Research, v. 2, no. 5, May 1967, p. 19.

   Battelle establishes a new 'Think Center', founded in Seattle, Washington, to provide chemists, physicists, and mathematicians (and ultimately life scientists) the opportunity to think about problems of science and humanity.

3. "Current Projects on Economic and Social Implication of Science and Technology 1965", National Science Foundation, Washington, D. C., NSF 66-21, 1966, 187 pp.

4. "1968 I·R Yearbook", Industrial Research (Buyers Guide), v. 9, no. 6, May 5, 1967, pp. 9-23.

   The advances and trends in the $24-billion research industry are outlined by 24 scientists, engineers and technical administrators who describe the accomplishments and futures of their respective fields.

5. "Perspectives in Federal Physics Support--an Interview With Chalmers Sherwin", Physics Today, v. 20, no. 9, September 1967, pp. 73-75.

   Comments on the significant results that Project Hindsight has for basic research, the objectives of Project Themis, and prospects for basic research support after Vietnam.

6. Allison, D., "The Growth of Ideas", International Science and Technology, no. 67, July 1967, pp. 24-32.

   Discusses two studies: (1) Project Hindsight, which is an examination of 20 weapon systems and the "events" which contributed to the development of those systems, and (2) a study of ten technological accomplishments, including the development of silicones and the development of Pyroceram glass, and the "research-engineering interactions" which contributed to those developments.

7. Bates, D. M., "Government and Science Policy. Selected References", The Library of Congress, Legislative Reference Service, Washington, D. C., Q125 USC, June 28, 1965, 27 pp.

8. Bates, D. M., "Science, Technology, and Public Policy. Selected References for 1965-1966", The Library of Congress, Legislative Reference Service, Washington, D. C., Q125 USC, SP129, May 9, 1967, 43 pp.

9. Caldwell, L. K., editor, "Science, Technology, and Public Policy; a Selective and Annotated Bibliography, 1945-1965", Indiana University, Institute of Public Administration, Bloomington, Indiana, 1965, Preliminary Draft, 12 individually paginated sections.

10. Daniels, G. H., "The Pure-Science Ideal and Democratic Culture", Science, v. 156, June 30, 1967, pp. 1699-1705.

    The origins of the pure-science ideal in America, the factors and conditions militating against the full realization of the ideal, and the fundamental dilemma of asking the public to provide support for the intellectual gratification of one select group.

11. Hollomon, J. H., "The U. S. Patent System", Scientific American, v. 216, no. 6, June 1967, pp. 19-27.

    Concepts and conditions leading to our present patent system, the role of patents in the economy and in international commerce, the effectiveness and problems of the present system, and the proposed Patent Reform Act of 1967.

12. Holton, G., editor, Science and Culture, Beacon Press, Boston (1967), 348 pp.

13. Lord Jackson of Burnley, "Science, Technology and Society", Nature, v. 215, September 2, 1967, pp. 1023-1026.

    An extract from his presidential address to the British Association, delivered on August 30, discussing the impact of the progress of science on society, the kinds of benefit which the public derives from this progress, and the kinds of problem which it creates for the community, for government, and for the scientists themselves.

14. Kranzberg, M., "The Unity of Science--Technology", American Scientist, v. 55, no. 1, 1967, pp. 48-66.

Review of the somewhat separate paths of science and technology up to the 20th century, and the factors now promoting their unity: the industrial research laboratory, development of research teams, complexity of prevailing problems, instrumentation required for their investigation, ability of individuals to move from science to technology, and pressure of public opinion and federal government.

15. Lakoff, S. A., editor, Knowledge and Power. Essays on Science and Government, The Free Press, New York (1966), 502 pp.

A collection of essays divided into "Cases and Controversies" (e.g., Mohole, Comsat), "Governing Science" (e.g., The Scientific Establishment and American Pluralism), and overview (e.g., Federal Support of Science).

16. LaPorte, T. R., "Politics and 'Inventing the Future': Perspectives in Science and Government", Public Administration Review, v. 27, no. 2, June 1967, pp. 117-127.

The meeting of science, government, and supporting institutions creates the capacity to invent the future, and raises implications for the political system. Areas of concern include the social and economic changes stimulated by technology, the effects technological changes have upon political and social values, and the organizational and policy responses to these changes.

17. Lear, J., "Beyond Vietnam: What Has Science to Say to Man?", Saturday Review, v. 50, no. 26, July 1, 1967, pp. 37-39.

Notes the abundance of isolated science policies, and the lack of a comprehensive policy aimed beyond Vietnam.

18. Mesthene, E. G., "The Impacts of Science on Public Policy", Public Administration Review, v. 27, no. 2, June 1967, pp. 97-104.

Science and technology have shortened the time span of physical change to the same order as that of social change and political action, and it has altered the possible ends and expanded the means of fulfilling these ends. "The job of policy today is to pace change, to anticipate it and to order it."

19. Meyer, J., "A Matter of Opinion", Scientific Research, v. 2, no. 8, August 1967, pp. 30-32.

Discussion of the activity of the Harris committee, and a wide range of science policy issues, including emphasis on applied biomedical research vs. basic research, sources of funding, the setting of goals and priorities, and the geographical distribution of research funds.

20. Rabi, I. I., "A Matter of Opinion", Scientific Research, v. 2, no. 9, September 1967, pp. 62-63.

Neither the public at large nor many able scientists themselves understand the central role of science in modern human affairs.

21. Rabinowitch, E., "Science Popularization in the Atomic Age", Impact of Science on Society, v. 17, no. 2, 1967, pp. 107-113.

The three main consequences of the scientific revolution are the spectacular rise in man's capacity to increase agricultural and industrial productivity, the population explosion, and the revolution of rising expectation. The task of science popularization is to educate mankind for living in the new world created by the scientific revolution.

22. Reagan, M. D., "Basic and Applied Research: A Meaningful Distinction?", Science, v. 155, March 17, 1967, pp. 1383-1386.

A critical review of the efforts to distinguish basic and applied research, and the political aspects of the definitions.

23. Rettig, R. A., "Bibliography on Science and World Affairs", U. S. Department of State, Foreign Service Institute, Washington, D. C., November 1964, 179 pp.

24. Roberts, W. O., "Science, A Wellspring of Our Discontent", American Scientist, v. 55, no. 1, 1967, pp. 3-15.

An examination of the cultural impact of science and its influence on past and future social organization and thought.

25. Sinsheimer, R., "The End of the Beginning", Bulletin of the Atomic Scientists, v. 23, no. 2, February 1967, pp. 8-12.

The importance of prophecy--the moral necessity of anticipation--becomes ever greater as we move increasingly into a world of our own making.

26. Sutherland, G., "Some Aspects of the U.S.A. Today: Science", American Scientist, v. 55, no. 3, September 1967, pp. 296-310.

An examination of the U. S.'s position in world science, and an exploration of the infra-structure (post-graduate training program, university staff and facilities, role of government, methods of financing, science policy, etc.) from which American basic science derives its strength. Concludes that the intellectual content of U. S. science should not be underrated nor its achievements overrated.

27. Weaver, W., "Matter of Opinion", Scientific Research, v. 2, no. 7, July 1967, pp. 32-36.

The role of private foundations in the age of big science.

28. Weinberg, A. M., Reflections on Big Science, Massachusetts Institute of Technology Press, Cambridge (1967), 192 pp.

Contents include the promise and problems of "big science", criteria for scientific choice and human values, and the institutions of big "science".

29. Zuckerman, S., Scientists and War. The Impact of Science on Military and Civil Affairs, Harper & Row, New York (1967), 177 pp.

A collection of essays dealing with the arms race, its economic consequences, other means for spurring development, secrecy in scientific research, and the prime role of scientists in setting priorities in basic and applied research.

II SCIENCE, DOMESTIC PROBLEMS, AND NATIONAL GOALS

1. "The Advancement of Knowledge for the Nation's Health - A Report to the President on the Research Program of the National Institute of Health", U. S. Department of Health, Education, and Welfare, Washington, D. C., July 1967, 202 pp.

2. "House Committee Plans to Assess Technology's Implications", Chemical and Engineering News, v. 45, no. 30, July 17, 1967, pp. 14-15.

   Congressional bills and resolutions for detecting and ameliorating undesired consequences of applied science and technology. Includes proposals for a Technology Assessment Board, a Select Committee on Technology and the Human Environment, and a Council on Environmental Quality.

3. "Policy Planning for Technology Transfer", U. S. Senate, Washington, D. C., 1967, A Report of the Subcommittee on Science and Technology to the Select Committee on Small Business, 183 pp.

   The report, prepared by the Science Policy Research Division of the Legislative Reference Service, presents an analysis of issues involved in obtaining the maximum benefits from Federal investments in R&D.

4. "Shannon Tells LBJ of Move Toward Directed Research", Scientific Research, v. 2, no. 8, August 1967, pp. 13-14.

   NIH's plans and mechanisms for shifting more emphasis to "directed research", and deterrents to progress (inadequate salary structure, and patent policies that inhibit industrial research in health-related areas).

5. "Task Force Report: Science and Technology", Institute for Defense Analyses, Arlington, Virginia, 1967, A Report to the President's Commission on Law Enforcement and Administration of Justice, 228 pp.

   Proposals by the Institute for Defense Analyses for the application of science and technology to law enforcement.

6. "Technological Innovation: Its Environment and Management", U. S. Department of Commerce, Washington, D. C., January 1967, Report by the Panel on Invention and Innovation, 83 pp.

   The report, prepared by the Commerce Technical Advisory Board, concludes that the social and business conditions which provide the opportunity for innovation are not understood, that the independent inventor and the small firm have a significant role in innovation, and that the contractual trends of the Department of Defense and NASA work against the interests of small technologically oriented organizations.

7. "U. S. Shapes Broad Aircraft Noise Program", Aviation Week & Space Technology, v. 87, no. 8, August 21, 1967, p. 39.

Federal government, through various military and civilian agencies, is undertaking a major coordinated attack on the aircraft noise problem in an effort to find solutions.

8. Allen, J. A., Scientific Innovation and Industrial Progress, Elsevier, New York (1967), 152 pp.

9. Anderson, J., "Crime Control: Task Force Urges Use of Science and Technology", Science, v. 156, June 23, 1967, pp. 1579-1582.

10. Brooks, H., "Applied Science and Technological Progress", Science, v. 156, June 30, 1967, pp. 1706-1712.

A general introduction to the NAS report on Applied Science and Technological Progress. Discusses "pure" and "applied" research, the research process, the role of government, industry and universities in applied research, the emergence of socio-technical problems, and mission-oriented laboratories.

11. Carter, L. J., "Technology and the Environment: A New Concern on Capitol Hill", Science, v. 157, August 18, 1967, pp. 784-786.

Current efforts in the Congress to cope with problems created by technology; the concept of "technological fix" for dealing with social problems that "yield slowly or not at all to the usual attempts at political solution."

12. Carter, L. J., "Water Resources: Congress Favors Taking a New Look", Science, v. 157, August 25, 1967, p. 906.

13. Daddario, E. Q., "Technology Assessment", U. S. House of Representatives, Ninetieth Congress, First Session, Washington, D. C., 1967, A statement of the Chairman, Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics, 19 pp.

Discussion of the need, method, and possible results of anticipating and assessing the desirable, undesirable, and uncertain consequences of technological innovations.

14. Gardner, J. W., "The Ten Commitments", Saturday Review, v. 50, no. 26, July 1, 1967, pp. 39-40.

15. Holloman, J. H., "Literate Engineering", Saturday Review, v. 50, no. 26, July 1, 1967, pp. 40-41.

Engineering is being alienated from the productive engineering economy by the nature and magnitude of the support given to university engineering research by defense and space agencies.

16. Hollomon, J. H., "New Patterns of Industry-Government Partnership", IEEE Spectrum, v. 4, no. 5, May 1967, pp. 78-82.

Many of the most pressing problems that plague our society could and should be solved by industry in cooperation with government, on a profitable basis.

17. Kalika, P. W., "Can Technology Clear the Air?", Machine Design, v. 39, no. 17, July 20, 1967, p. 18 + 15 pages.

Five papers discuss the growing problem of air pollution, costs of damage, available research funds, government controls, committees being formed by technical societies, and emissions from autos and cleaning machines.

18. Langer, E., "LBJ at NIH: President Offers Kind Words for Basic Research", Science, v. 157, July 28, 1967, pp. 403-405.

Discusses the President's visit to NIH, and the continuing debate on the relative emphasis to be placed on medical research and public health programs.

19. Lecht, L. A., Goals, Priorities, and Dollars. The Next Decade, The Free Press, New York (1966), 365 pp.

The costs of achieving national goals, over the next decade, in 16 broad areas are estimated from current trends and consensual information. The areas include Urban Development, Health, Education, Transportation, National Defense, R&D, Space, and Area Redevelopment. "The costs of the entire complex (of goals) are estimated to exceed the resources we are capable of generating without severe strains on our social and economic institutions."

20. Nelson, R. R., Peck, M. J., and Kalachek, E. D., Technology, Economic Growth, and Public Policy, Brookings Institution, Washington, D. C. (1967), 252 pp.

A survey, synthesis, and interpretation of the literature regarding technological change and economic growth, and the related problems and issues of public policy.

21. Orlans, H., editor, The Use of Social Research in Federal Domestic Programs, U. S. House of Representatives, Washington, D. C., 1967. Volume I, Federally Financed Social Research, Expenditures, Status, and Objectives, 385 pp. Volume 2, The Adequacy and Usefulness of Federally Financed Research on Major National Social Problems, 643 pp. Volume 3, The Relation of Private Social Scientists to Federal Programs on National Social Problems, 611 pp. Volume 4, Current Issues in the Administration of Federal Social Research, 666 pp.

22. Schon, D. A., Technology and Change. The New Heraclitus, Delacorte Press, New York (1967), 270 pp.

A discussion of the processes of invention and innovation, the attitudes toward technological innovation, and the actual and desired role of the federal government in innovation.

23. Stover, C. F., "Industry, Technology, and Metropolitan Problems", Public Administration Review, v. 27, no. 2, June 1967, pp. 112-117.

An assessment of the feasibility of bringing industrially-based capabilities in system analysis, engineering, and management to deal with public problems, and the preconditions necessary for exploiting these techniques.

III NEEDS AND ALLOCATION OF RESOURCES FOR SCIENCE

1. "Chemical Industry Giving More to Schools", Chemical & Engineering News, v. 45, no. 34, August 14, 1967, pp. 18-20, 22-24.

   The U. S. chemical industry's support of education, assessed in the context of support to college and universities from all sources.

2. "Concentration of Science Should Be Encouraged", Chemical & Engineering News, v. 45, no. 31, July 24, 1967, pp. 11-12.

   Testimony before the Senate Subcommittee on Government Research supporting the concentration of funding in those areas most capable of performing it.

3. "Geographic Distribution of Federal Funds for R&D in Fiscal 1965", National Science Foundation, Washington, D. C., NSF-67-8, 1967, 188 pp.

   Comprehensive statistical data of funding agencies and the distribution of funding on a geographic basis among industry and educational institutions. Between 1963 (the only other year for which relatively complete R&D data are available) and 1965, there was "relatively little change in the distribution among geographic divisions".

4. "Haworth: Keep Project Grants, Provide More Institutional Support", Scientific Research, v. 2, no. 6, June 1967, pp. 13, 15.

   In what could constitute a statement of National Science Foundation policy for basic research funding, NSF Director Leland J. Haworth said last month that the project grant system should continue, supplemented by more institutional grants support used more flexibly than at present.

5. "In '68: A Close Look by Congress at Federal Grant Policy?", Scientific Research, v. 2, no. 8, August 1967, pp. 14-15.

   Survey of congressional bills aimed at overhauling the research grant system to allow institutional and regional grants and to establish regional research centers.

6. "Institutional Grants Plan Gets Support From Philip Handler of Science Board", Scientific Research, v. 2, no. 7, July 1967, p. 14.

   Support for grants to colleges and universities for costs of direct operations, without altering the present research proposal system.

7. "National Patterns of R&D Resources, 1953-1968--Funds and Manpower in the United States", National Science Foundation, Washington, D. C., NSF-67-7, April 1967, 26 pp.

U. S. R&D expenditures projected at $25 billion in 1968. Annual growth rate of 6.9 percent for the 1965-68 period compared with a 9.5 average annual growth rate over the 1958-1965 period. R&D expenditures between 1953-65 rose at an annual rate of 12.1 percent, compared with a 5.1 percent rate for the GNP. During the same period, R&D manpower had an annual average increase of 7.1 percent compared with 1.5 percent for the national labor force.

8. "NSF Needs More Money", Scientific Research, v. 2, no. 7, July 1967, p. 5.

If the Administration is really sincere in its protestations about the importance of basic research; if basic research is to grow--at whatever rate--or even hold its own, then a greater degree of courage in setting the NSF budget request is called for.

9. "NSF: Senate Cuts Appropriations", Science, v. 157, September 8, 1967, p. 1156.

If the Senate appropriations subcommittee recommendations are upheld on the Senate floor and in a conference with the House (which appropriated more), the NSF will receive reduced funding for the first time in its 18-year history. The Senate subcommittee recommended only $459 million for fiscal year 1968--$21 million below last year's appropriation, $36 million below the House recommendation, and $67 million below NSF's original request.

10. "No Simple Solution Apparent to R&D Distribution Puzzle", Chemical & Engineering News, v. 45, no. 30, July 17, 1967, pp. 13-14.

Recommendations of Hornig and Hollomon on the geographical distribution of R&D funds.

11. "Project Dollars Tight at NSF--And Getting Tighter", Scientific Research, v. 2, no. 7, July 1967, p. 27.

The National Science Foundation has been able to fund only about a third of the research covered by applications for project grants--and from the way Congress has been cutting its fiscal 1968 budget, the situation will probably get worse before it gets better.

12. "Sputnik Era is Over--Now Science Must Compete for Support", Space/Aeronautics, v. 48, no. 3, August 1967, pp. 20, 22-24, 26.

13. "Support Mounts for Regional R&D Grants", Scientific Research, v. 2, no. 9, September 1967, p. 35.

A discussion of the growing support in the senate, executive, and universities for federal R&D funding on a regional basis.

14. Brooks, H., "Science and the Allocation of Resources", American Psychologist, v. 22, no. 3, 1967, pp. 187-201.

Developments in science policy since WW II, the pressures for the planning of science, the existing system of decision making for science, and science planning and the multidimensional nature of choice.

15. Greenberg, D. S., "Money for Research: LBJ's Advisers Urge Scientists to Seek Public Support", Science, v. 156, May 19, 1967, pp. 920-922.

A discussion of the increasing need to rationalize and justify the funding of basic research in terms understandable and acceptable to the public.

16. Niblock, R. W., and Montgomery, S., "Deep Ocean Technology May Spur Funding", Technology Week, v. 20, no. 23, June 5, 1967, pp. 40-44.

A review of the growing R&D program in ocean technology, with emphasis on sources and quantity of funding.

17. Reagan, M. D., "R&D: Suggestions for an Allocations Framework", Public Administration Review, v. 27, no. 2, June 1967, pp. 104-111.

A rationale for research support allocation and some of the criteria inputs and practical institutional complications involved in practicing any allocational system.

IX NATIONAL R&D PROGRAMS

1. "Accelerator in Jeopardy", Industrial Research, v. 9, no. 8, July 1967, p. 19.

   The various forces opposing the location of the 200-billion-electron-volt proton accelerator in the Chicago suburb of Weston, Ill., may bring about cancellation of the entire project.

2. "How to Change the Weather?", Industrial Research, v. 9, no. 8, July 1967, p. 21.

   Programs, organizations, and budgets in weather modification R&D are discussed.

3. "Marine Science Affair--A Year of Transition", The National Council on Marine Resources and Engineering Development, Washington, D. C., February 1967, A Report to the President, 157 pp.

   The first report by the Marine Sciences Council; elaborates the Council's interpretation of the policy and purposes of the Marine Resources and Engineering Development Act, and discusses nine priority efforts in marine sciences.

4. "NASA Authorization for Fiscal Year 1968", U. S. Senate, Ninetieth Congress, First Session, Washington, D. C., 1967, Hearings before the Committee of Aeronautical and Space Sciences, pp. 436-439.

5. "Radio Astronomy: NSF Scrutinizing Proposals for Six Major Instruments", Science, v. 157, August 18, 1967, pp. 782-783.

6. "Space: 1971 Mariner Mission Knifed by Budget Cutters", Science, v. 157, August 11, 1967, p. 658.

7. "The Space Program in the Post-Apollo Period", The White House, Washington, D. C., February 1967, A Report of the President's Science Advisory Committee, Prepared by the Joint Space Panels, 99 pp.

   Assessment of the space program and recommendations for post-Apollo goals by PSAC.

8. "A Survey of Space Applications", Space Applications Programs Office, Office of Space Science and Applications, Washington, D. C., NASA SP-142, April 1967, 135 pp.

   Surveys actual and potential applications of space technology in communications, earth resources, geodesy, meteorology, and navigation, along with some of the policy, legal, social, economic, and political factors involved in such applications.

9. "SST Protest Group", Industrial Research, v. 9, no. 9, August 1967, p. 23

Background and activity of the "Citizens League Against the Sonic Boom".

10. Brown, A. H., "The Post-Apollo Era--Decisions Facing NASA", Bulletin of the Atomic Scientists, v. 23, no. 4, April 1967, pp. 11-15.

"As we move into the post-Apollo era, no single inspirational goal can be or should be identified." A balanced and diversified program aimed at a "series of worthwhile objectives would appear to be more logical on scientific as well as political grounds than a concentration of effort on a single national goal."

11. Coley, F. H., "The United States Government Desalination Program", Metals Engineering Quarterly, v. 7, no. 3, August 1967, pp. 1-4.

A description of the Saline Water Conversion Program, its R&D activities and technological objectives, and the responsibilities of the Office of Saline Water.

12. Daddario, E. Q., "Congress Faces Space Policies", Bulletin of the Atomic Scientists, v. 23, no. 5, May 1967, pp. 11-15.

An analysis of the attitudes of Congress toward space, and the proposal that the space program be funded at a level of about one percent of the GNP for the next several years.

13. Glos, M., "Shortage of Large Telescopes Causes Crisis in Astronomy", Scientific Research, v. 2, no. 6, June 1967, pp. 45-48.

Discussion of the needs, costs, and plans for large optical telescopes.

14. Graham, D. M., "Weston Accelerator Faces Hurdles", Industrial Research, v. 9, no. 10, September 1967, pp. 20-21.

Congressional opposition and failure of Illinois to pass an "open occupancy" law jeopardize construction of the 200-bev accelerator; delay reduces opportunities for U. S.-U.S.S.R. cooperative programs.

15. Green, F., "How the Sea Grant College Bill Was Engineered Through Congress", Undersea Technology, v. 8, no. 8, August 1967, pp. 23-26, 32, 36.

An informal "case study" of the people and circumstances involved in the passage of the Sea Grant College and Program Act of 1966.

16. Knopf, W. C., and Clotworthy, J. C., "Ocean Engineering", Oceanology International, v. 2, no. 4, June 15, 1967, p. 29.

Available engineering manpower is far short of needs in oceanography, and little is being done to meet the demand of a three to fourfold increase in ocean engineers in the next decade.

17. Lewis, R. S., "Goal and No Goal: A New Policy in Space", Bulletin of the Atomic Scientists, v. 23, no. 5, May 1967, pp. 17-20.

New space policy calls for an extension of manned lunar and unmanned planetary investigations, but does not define particular goals for scientists in space, on the moon, or in the university laboratories; this shift in policy threatens university research and NASA-supported student training programs.

18. MacDonald, G. J. F., "Science and Space Policy: How Does It Get Planned?", Bulletin of the Atomic Scientists, v. 23, no. 5, May 1967, pp. 2-9.

An examination of the decision-making procedure for space science, including the roles of OSSA, various government committees, and the scientific community in long, middle and short-term objectives.

19. Malone, T. F., "Weather Modification: Implications of the New Horizons in Research", Science, v. 156, May 19, 1967, pp. 897--901.

This article contains an appraisal of the state-of-the-art for modifying weather, and a discussion of policy issues associated with the character, size, rate of growth, and management of our domestic programs, as well as the international implications and opportunities.

20. McElhenny, V. K., "Radio Astronomy: Dicke Panel Reaches Its Conclusions", Science, v. 157, August 25, 1967, pp. 907, 909, 910.

The NSF recommendations for radio astronomy facilities are presented and discussed.

21. McLean, M. C., "What Did Mohole Accomplish?", Oceanology International, v. 2, no. 5, July/August 1967, pp. 32-35.

The achievements of Project Mohole include "the development of ways to core the ocean bottom in deep water, a better understanding of the geophysics of several ocean areas, and the improvement of drilling instruments and techniques."

22. Newell, H. E., and Jaffe, L., "Impact of Space Research on Science and Technology", Science, v. 157, July 7, 1967, pp. 29-39.

The impact of the space programs on space science, geoscience, physics, astronomy, and bioscience; applications in geodesy, communications and navigation, meteorology, and earth resources survey.

23. Samuelson, R. J., "The SST and the Government: Critics Shout Into a Vacuum", Science, v. 157, September 8, 1967, pp. 1146-1151.

The trials and tribulations of the Supersonic Transport (SST), differences of opinion regarding its method of funding, its economic and environmental (sonic boom) impact, its political support, and its critics and their weak position in respect to the proponents of the SST.

X SCIENCE, EDUCATION, AND THE UNIVERSITY

1. "Federal Support to Universities and Colleges, Fiscal Years 1963-66", National Science Foundation, Washington, D. C., NSF 67-14, 1967, 137 pp.

   Comprehensive compilation of statistics, trends and correlational data on U. S. financial assistance to institutions of higher learning.

2. "The Junior College and Education in the Sciences", U. S. House of Representatives, Ninetieth Congress, First Session, Washington, D. C., 1967, Report of the National Science Foundation to the House of Representatives Subcommittee on Science, Research, and Development, 103 pp.

3. "Mounting an Attack on Research Red-Tape", Scientific Research, v. 2, no. 6, June 1967, pp. 35-38.

   "Washington, in many places and at many levels, is trying to reduce the red tape burdening the university holders of federal research grants. Most of the movement to date has been sideways, but there are unmistakable signs of some relief in the offing for the universities, particularly in the controversial areas of cost-sharing and time-and-effort reporting".

4. "1967 Report on Federal Money and Recent Legislation for Education", American Education, U. S. Department of Health, Education and Welfare, Office of Education, Washington, D. C., February 1967, 12 pp.

5. "1967 Report on Federal Money for Education", reprinted from American Education, U. S. Department of Health, Education, and Welfare, Office of Education, Washington, D. C., February 1967, 7 pp.

6. "Overberger Assesses Centers of Excellence", Chemical & Engineering News, v. 45, no. 7, February 13, 1967, pp. 44-45.

   Dr. Charles G. Overberger, President of the ACS, balances the achievements of the National Science Foundation's "centers of excellence" program with some of its inherent problems.

7. "Partnership Between Federal Government and American Universities in Financing Scientific Enquiry", U. S. Treasury Department, Washington, D. C., February 27, 1967, remarks by True Davis, Assistant Secretary of Treasury and United States Executive Director of Inter-American Development Bank at Royal Netherlands Academy of Sciences, Amsterdam, Netherlands, 10 pp.

8. "Science and Engineering Staff in Universities and Colleges 1965-1975", National Science Foundation, Washington, D. C., NSF 67-11, May 1967, 25 pp.

Science and engineering staffs in U. S. universities will double in the next 10 years. Staff shortages are expected to peak during the 1967-70 academic year, but to be resolved by 1974.

9. Science, Government and the Universities, University of Washington Press, St. Louis (1966), 116 pp.

10. Adams, T. W., and Murphy, T. P., "NASA's University Research Program: Dilemmas and Problems on the Government-Academic Interface", Public Administration Review, v. 27, no. 1, March 1967, pp. 10-17.

11. DuBridge, L. A., "University Basic Research", Science, v. 157, August 11, 1967, pp. 648-650.

A statement of the case for university basic research, the need for a discourse aimed at a national policy for the support of basic science, and the budgetary strengthening of NSF to provide the needed support.

12. Greenberg, D. S., "The Administration of Federal Aid: A Monstrosity Has Been Created", Science, v. 157, July 7, 1967, pp. 43-47.

The results of a survey conducted by Science indicate a wide spread dissatisfaction with the administrative system for providing federal support for academic research and higher education.

13. Handler, P., "Academic Science and the Federal Government", Science, v. 157, September 8, 1967, pp. 1140-1146.

A comprehensive appraisal of the problems confronting government-university relations in academic science, with policy recommendations. Emphasis is placed on the integral nature of graduate education and research, the management of research grants, the need for funding patterns ranging from consortia of universities to individual research grants, the mismatch between mission-oriented research and the disciplinary structure of universities, and the possible future desirability of regrouping NSF, Endowment for the Humanities, Office of Education and the NIH's into a Department of Science and Education.

14. Keenan, B. R., editor, Science and the University, Columbia University Press, New York (1966), 207 pp.

15. Orlans, H., "Developments in Federal Policy Toward University Research", Science, v. 155, February 10, 1967, pp. 665-668.

Critical discussion of allocations for academic science, the rationale of its support, the opportunity that reduced funds bring for reasserting "standards of research quality", protection of human subjects, conflicts of interest, and the new interest in the social sciences.

16. Pake, G., "Basic Research and Financial Crisis in the Universities", Science, v. 157, August 4, 1967, pp. 517-520.

The impact of the reduced growth rate of federal funds on universities, the special financial problems of private universities, the morass of "red tape", pressures on universities to cure applied problems, the failure of society to pay in full for the services demanded of the university, and the "gimmickitus" and "hit and run" tactics of foundations and government agencies in supporting the university.

17. Pitzer, K. S., "How Much Research?", Science, v. 157, August 18, 1967, pp. 779-781.

A discussion of the components of a program for federal support of science in universities, which provides "a basic minimum of funding proportional to the growth of the research student population" and "a pattern of grants based upon justified need and individual merit for more costly instruments, post-doctoral appointments".

VI SCIENCE MANAGEMENT AND POLICY-MAKING BODIES

1. "Activities of the Federal Council for Science and Technology: Report for 1965 and 1966", Federal Council for Science and Technology, Washington, D. C., 1967, 47 pp.

   The role of the FCST, in terms of the kinds of questions that are and are not considered, its consideration of the recommendations of nongovernmental scientific advisory groups, and its influence on national science policy.

2. "Committee Staffing", Industrial Research, v. 9, no. 9, August 1967, pp. 18-19.

   The proposed Legislative Reorganization Act of 1967 would allow the Legislative Reference Service to appoint a larger number of senior technical specialists, authorize standing committees to hire ad hoc consultants, and give the minority party specific staff representation.

3. "Congressional Science Committee", Science, v. 156, April 14, 1967, p. 227.

   Congressional bill to establish a Joint Congressional Committee on Science and Technology to promote efficient management and coordination for all federal scientific and technical programs.

4. "Hornig Fights in Senate for Larger Budget", Scientific Research, v. 2, no. 9, September 1967, pp. 36-37.

   Efforts to increase OST's fiscal-'68 budget to carry out "government-wide coordination of energy policy", "planning, development, and coordination of systems for handling scientific and technical information", and "to provide OST with staff in the earth sciences, life sciences, and Congressional liaison".

5. "Hornig on Research Policy: Public Understanding", Science, v. 156, May 5, 1967, pp. 628-629.

   An extensive statement on the scientific and technical policies of the Johnson Administration delivered in a speech to the American Physical Society by Donald F. Hornig.

6. "NRC Social Sciences Group Studies Research Bodies", Scientific Research, v. 2, no. 6, June 1967, pp. 23, 25.

   A committee has been set up within the National Research Council to survey international organizations in the social and behavioral sciences and to recommend ways of improving their usefulness and capabilities.

7. "The Office of Science and Technology", U. S. House of Representatives, Committee on Government Operations, Washington, D. C., March 1967, A Report Prepared by the Science Policy Research Division of the Legislative Reference Service, Library of Congress, 326 pp.

   This report reviews "the origins of the Office of Science and Technology, discusses relationships between that Office and the other elements of the White House science advisory structure, diagrams operating procedures, relationships to other Federal agencies, the scientific community and universities, and summarizes White House involvement in science policy matters."

8. "A Rare Glimpse Inside the Budget Bureau", Scientific Research, v. 2, no. 7, July 1967, pp. 29-31.

   The Budget Bureau's enormous influence on R&D budgeting, large national science programs, federal organizations and management of science and technology, and research-grant management.

9. "In Science Policy, Who Holds the Power?", Science News, v. 91, no. 14, April 8, 1967, p. 326.

   Roles and interactions among the Federal science policy-making bodies.

10. "Science, Technology, and Public Policy During the Eighty-Ninth Congress, January 1965 Through December 1966", U. S. House of Representatives, Committee on Science and Astronautics, Ninetieth Congress, First Session, Washington, D. C., 1967, Report of the Subcommittee on Science, Research, and Development, 202 pp.

11. "20th National Conference on the Administration of Research", The Univeristy of Denver, Denver, Colorado, 1967, Proceedings of meeting held October 26-28, 1966, at Miami Beach, Florida, 174 pp.

    Papers discuss the evaluation of individuals and groups, planning and evaluation of research programs and facilities, transfer and diffusion of research results, and utilization of research output.

12. World Directory of National Science Policy-Making Bodies. Volume I. Frances Hodgson Ltd., London (1966), 356 pp.

13. Abelson, P. H., "The Office of Science and Technology", Science, v. 156, April 14, 1967, p. 173.

    Structure of OST remains unchanged since its inception, although the scope and type of policy issues have changed significantly. Increasing role of Congress "could lead to back seat in science policy making" for OST.

14. Caldwell, L. K., "Managing the Scientific Super-Culture: The Task of Educational Preparation", Public Administration Review, v. 27, no. 2, June 1967, pp. 128-133.

The crucial role of knowledge in "high information-level culture", "knowledge administration", and the fusion of technical and teleological (values, goals, and consequences) knowledge into alternatives amenable to political action.

15. Cote, A. J., Jr., "Who Tells Congress About Technology?", Industrial Research, v. 9, no. 10, September 1967, pp. 78-82.

A critical discussion of the existing mechanisms, and proposed new ones, for providing Congress with science policy advice.

16. Goldstein, W., "The Science Establishment and Its Political Control", The Virginia Quarterly Review, v. 43, no. 3, Summer 1967, pp. 353-371.

Results of the burgeoning scientific and technical activity: the involvement of experts in the non-elective positions in government, the increasing reliance upon war or national crises to stimulate public support of scientific expansion, and the incorporation of a science establishment. Explores the size and nature of the science establishment, and mechanisms for politically controlling it. "A national plan must be designed if the nation's science activities are to be promoted in an orderly and beneficial manner."

17. Greenberg, D. S., "Social Sciences: Progress Slow on House and Senate Bills", Science, v. 157, August 11, 1967, pp. 660-662.

Status and prospects for bills to strengthen the social sciences.

18. Handler, P., "Federal Science Policy", Science, v. 155, March 3, 1967, pp. 1063-1066.

Roles of the President's Science Advisory Committee and the National Science Board.

19. Harris, F. R., "The Case for a National Social Science Foundation", Science, v. 157, August 4, 1967, pp. 507-509.

Recitation of the social problems confronting the nation, congressional testimony supporting increased aid to the social sciences, and the broad outlines of the proposed National Foundation for the Social Sciences. "The establishment of a... Foundation...will give the recognition, status, visibility, and prestige the social sciences need."

20. Kantrowitz, A., "Proposal for an Institution for Scientific Judgment", Science, v. 156, May 12, 1967, pp. 763-764.

Proposal for an independent source of scientific advice for the Congress.

21. Morton, J. A., "A Systems Approach to the Innovation Process: Its Use in the Bell System", Business Horizons, v. 10, no. 2, Summer, 1967, pp. 27-36.

"As a process, innovation can be studied and managed from the systems viewpoint". Systems engineering offers "a reasonable basis for prejudging the industrial relevance and cost-effectiveness of new large development projects before large commitments and expenditures are made."

22. Nelson, B., "White House Science Office: Report Urges Expanded Role", Science, v. 156, April 7, 1967, pp. 50-51.

Critics of the Office of Science and Technology (OST) generally split into two camps: those who argue that the organization exerts too much influence over federal science affairs and those who argue that it exerts too little.

23. Samuelson, R. J., "Council of Social Advisers: New Approach to Welfare Priorities?", Science, v. 157, July 7, 1967, pp. 49-50.

Congressional bill to create a three-member Council of Social Advisers, modeled after the Council of Economic Advisers, to deal with the "social health" of the nation.

24. Sartwell, F., "Effective Advisers to Congress", Science News, v. 91, no. 14, April 8, 1967, p. 335.

Description of the Science Policy Division of the Library of Congress, including its origins, key personnel, and mode of operation.

25. Walker, E. A., "National Science Board: Its Place in National Policy", Science, v. 156, April 28, 1967, pp. 474-477.

A review of the origins, evolution, and problems of the National Science Board, with recommendations for restoring some of its lost authority.

XII SCIENCE, FOREIGN AFFAIRS, AND NATIONAL DEFENSE

1. "Application of Science and Technology to Development", UN Monthly Chronicle, v. 4, no. 6, June 1967, pp. 72-73.

   A report on the activities of the United Nations Advisory Committee on the Application of Science and Technology to Development; topics include means for increasing the supply and consumption of protein in developing countries, acceleration of the development of natural resources through science and technology, national vs. regional programs of science and technology, and international collaboration in such programs.

2. "The Brain Drain Into the United States of Scientists, Engineers, and Physicians", U. S. House of Representatives, Ninetieth Congress, First Session, Washington, D. C., July 1967, Staff Study for the Research and Technical Program Subcommittee of the Committee on Government Operation, 110 pp.

   Scientific immigrants from the developing nations in 1966 totaled 4390; 6000 students from these nations were graduated from U. S. colleges and universities during the same period, for a net gain of three in ten new graduates to the developing nations. Sixty percent (2600) of the immigrants came from 13 nations receiving the bulk of U. S. aid.

3. Fewer 'Brains' Hear U.S.A.'s Siren Song", Business Week, May 27, 1967, pp. 100, 103.

   Data presented show that the number of engineers coming to the U. S. is decreasing, while the number of natural scientists is increasing; however, the total number of technically trained migrants has been declining since 1963.

4. "Government, Science, & International Policy", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Papers Prepared for the Eighth Meeting of the Panel on Science and Technology, 81 pp.

   Seven papers dealing with: the interfaces of science-technology and international policy, means of achieving national objectives and improving relationships among nations through science, and the scientific enterprise in specific nations.

5. "Impact of Chinese Communist Nuclear Weapons Progress on United States National Security", Report of Joint Committee on Atomic Energy, Ninetieth Congress, First Session, 1967.

6. "Migration of Health Personnel, Scientists and Engineers From Latin America", World Health Organization, Washington, D. C., Science Publication No. 142, September 1966.

7. "Participation of Federal Agencies in International Scientific Programs", U. S. House Science and Astronautics Committee, Ninetieth Congress, First Session, Washington, D. C., 1967, report of Science Policy Research and Foreign Affairs Divisions, Legislative Reference Service, to Subcommittee on Science, Research, and Development, 167 pp.

8. "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies", Staff Report of the U. S. Senate Committee on Aeronautical and Space Sciences, Ninetieth Congress, First Session, 1967.

9. Blackett, P. M. S., "The Ever Widening Gap", Science, v. 155, February 24, 1967, pp. 959-964.

   A discussion of strategies for the development and application of science and technology to reduce the "ever widening gap" between the rich and the poor nations.

10. Clamann, J., "European Co-operation in Defence Technology: The Political Aspect", The Institute for Strategic Studies, London, England, Defence, Technology and the Western Alliance No. 1, April 1967, 23 pp.

11. Dougherty, J. E., Arms Control and Disarmament: The Critical Issues, Renaissance Editions, New York (1966).

12. Greenberg, D. S., "Pollack to Head State Science Office", Science, v. 157, July 21, 1967, p. 292.

   The appointment of Herman Pollack to the long vacated directorship of the State Department's Office of International Scientific and Technological Affairs.

13. Hornig, D. F., "World Comity Through Science and Technology", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science & International Policy", pp. 23-29.

   Some means of international cooperation and collaboration via science and technology, and a plea for bringing the scientific community into discussions of "international problems which are not in themselves technical, but which have large technical components".

14. Jacobson, H. K., and Stein, E., Diplomats, Scientists, and Politicians: The United States and the Nuclear Test Ban Negotiations, University of Michigan Press, Ann Arbor (1966), 512 pp.

15. Kemmons, N. A., "Science and the Air Force: A History of the Air Force Office of Scientific Research", Office of Aerospace Research, Arlington, Virginia, 1966, OAR 66-7, 175 pp.

An official history of the struggle to establish and maintain a basic research program in the Air Force.

16. Langer, E., "Chemical and Biological Weapons: Once Over Lightly on Capitol Hill", Science, v. 156, May 26, 1967, pp. 1073, 1075.

No overt reaction to the petition, signed by over 5,000 scientists, to reexamine and publicly state the government's policies on chemical and biological weapons (CBW); congressional testimony indicates that CBW is part of the overall strategy of deterrence.

17. Long, F. A., "Scientists in Foreign Affairs: Where Do We Go Now?", Bulletin of the Atomic Scientists, March 1967, pp. 14-18.

Past contributions of scientists to foreign affairs, examples of other problems to which they might contribute, and the need for cooperation between scientists and scholars from different fields, a greater use of biologists and medical personnel, studies of increased sophistication and depth, improved methods of disseminating information, and specific proposals for initiative action by scientists.

18. Mendelssohn, K., "Science in China", Nature, v. 215, July 1967, pp. 10-12.

A short review by an Oxford University physicist who has been in China three times in the last seven years. One conclusion: China's rising scientific and technological progress may not be greatly affected by the current internal unrest.

19. Mondale, W. F., "How Poor Nations Give to the Rich", Saturday Review, March 11, 1967, pp. 24-26.

Our training of foreign students who fail to return home is serving to widen a "talent gap" in underdeveloped countries; calls for: more research on the magnitude and causes of the brain drain, expansion of educational opportunities for Americans in areas where we are dependent on manpower from developing nations, university programs for foreign students more relevant to the needs of their homelands, help to developing countries to make effective use of their skilled people, and modification of our visa and immigration policies.

20. Pollack, H., "Science, Foreign Affairs, and the State Department", Department of State Bulletin, v. 56, June 19, 1967, pp. 910-917.

The present and future importance of the interaction between science and foreign affairs, the attitude of the Department of State on the subject, and the response of the Department to the challenge of science in foreign affairs.

21. Rusk, D., "Government, Science, and International Policy", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 1-5.

A general discussion of the "uncharted region where the interests of science and foreign policy meet".

22. Seaborg, G. T., "What's Ahead for International Science?", Bulletin of the Atomic Scientists, v. 23, no. 1, January 1967, pp. 24-28.

The basis and needs for international cooperation in research, and examples of present cooperative efforts and institutional mechanisms for future collaboration.

23. Sherwin, C. W., and Isenson, R. S., "Project Hindsight", Science, v. 156, June 23, 1967, pp. 1571-1577.

A summary of the controversial DOD study of the utility of research for the development of weapon systems.

24. Skolnikoff, E. B., Science, Technology, and American Foreign Policy, M.I.T. Press, Cambridge (1967), 346 pp.

Examination of the kinds of interactions between science and foreign policy issues; assessment of major issues, institutions, and individuals associated with foreign affairs; prescriptions for improving the policy-making process.

25. Stern, R. L., editor, Technology and World Trade: Proceedings of a Symposium, U. S. Department of Commerce, Washington, D. C., NBS Misc. Pub. 284, 1967, 162 pp.

Objective of the symposium was to examine and forecast the impact of technology upon the patterns and conduct of international trade and investment, to consider the international environment needed for the wider generation and utilization of technology, and to explore prospects for evolving policies and institutions that promote economic development through technology and trade.

26. Walsh, J., "Environmental Pollution: West Germany, U. S. Cooperate", Science, v. 157, August 4, 1967, pp. 529-531.

Cooperative effort includes exchange visits, joint research, and wide dissemination of results, in the broad area of pollution control; brief description of some of the current projects and prospects.

XIII SCIENCE POLICY IN FOREIGN COUNTRIES

1. "Europeans Surveying Requirements to Set Up a Graduate School in Science, Technology", The Science World, v. 2, no. 8, August 1967, p. 15.

   Survey, to be completed by October 1967, to determine the cost, objectives, and location of a European Institute of Science and Technology, aimed at alleviating the technological imbalance between the U. S. and western Europe. Other recommended measures include an overall strategy for European science and technology, improved mobility of scientists, and expansion and democratization of higher education.

2. "Great Britain Council for Science Policy", Report of the Working Party on Liaison Between Universities and Government Research Establishments, H. M. Stationery Office, 1967, 204 pp.

3. "The Politics of Science", The Political Quarterly, v. 38, no. 1, January-March 1967, 89 pp.

   Includes articles on: "The Politics of Science"; Bernal, J. D., "Public Policy and Science"; Finniston, H. M., "University Science and Industry"; Warner, F. E., "Education in Science and Technology"; Sutherland, G., "The Brain Drain"; Pirie, N. W., "Science and Development"; Margerison, T. A., "Hopes and Fears for the Age of Leisure"; Goldsmith, M., "The Autonomy of Science".

4. "Principles and Problems of National Science Policies", United Nations Educational, Scientific, and Cultural Organization, Science Policy Studies and Documents, Paris, France, Report No. 5, 1967.

   A report of the meeting of co-ordinators of science policy studies in Czechoslovakia in June 1966.

5. Reviews of National Science Policy: United Kingdom and Germany, Organization for Economic Co-operation and Development, Paris (1967), 259 pp.

   A comprehensive, comparative study of science policy in the U. K. and Germany, focusing on (1) the financing of civil scientific research, (2) relationship between university research and research in government establishments, research councils, and industry, (3) university research requiring costly facilities, (4) educational subject matter requirements and university entrance standards, (5) duration of studies and their content, and (6) organization and definition of the education of engineers.

6. "Science Policy and Organization of Research in Norway", United Nations Educational, Scientific and Cultural Organization, Paris, France, Science Policy Studies and Documents No. 4, 1966.

7. "Science Policy in Latin America: Substance, Structure, and Processes", World Health Organization, Washington, D. C., Scientific Publication No. 119, March 1966.

8. "Science Policy Information", Organization for Economic Co-operation and Development, Paris, France, January 1967; Volume I, 51 pp., Volume 2, 98 pp.

News, information, and bibliography of science policy activities in foreign countries.

9. "SSP Newsletter", Science of Science Foundation, v. 2, no. 3, August 1967, 12 pp.

August issue of the bimonthly newsletter devoted to "topics of interest in the field of the science of science".

10. "Structural and Operational Schemes of National Science Policy", United Nations Educational, Scientific, and Cultural Organization, Science Policy Studies and Documents, Paris, France, Report No. 6, 1967.

Conclusions and recommendations of the third meeting on science policy and research organizations in the countries of North Africa and the Middle East, in September 1966.

11. "Technology Has an Inexorable Effect", International Science and Technology, no. 69, September 1967, pp. 48-52.

An interview with Britain's Minister of Technology on progress, plans, and prospects, for rejuvenating Britain's industry and technology.

12. "What is Science Policy", Nature, v. 215, September 2, 1967, pp. 1013-1016.

Criticism of the usual yardsticks used to assess science policy and some reformulations of key issues.

13. Chagas, C., "Science and Technology in Latin America", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 7-21.

Discusses the social and economic impediments to the development and use of science and technology in Latin America, the lack of relationship between science and technology, and the small number of scientific institutions; outlines a policy of scientific and technological development, with emphasis on education, infrastructure, and dissemination of technical information.

14. Clarke, Robin, "Akademgorodok: Eastern Centre for Western Science", Science Journal, v. 3, no. 8, August 1967, pp. 81-86.

"The decision to build a 'science city' in the heart of Siberia was taken ten years ago. A further experimental scheme, to bring the results of scientific advance to industry more quickly and efficiently, is about to be started."

15. Copisarow, A. C., "The Key to Europe's Prosperity", New Scientist, v. 34, June 1, 1967, pp. 522-524.

Discussion of Europe's shortcomings in R&D, management and exploitation of technological resources, education, and other factors underlying the "technology gap"; recommendations for pooling Europe's resources in selected industries having "a high content of skill".

16. Dobrov, G. M., Science of Science: Introduction to the General Science of Science, Naukova Dumka, Kiev (1966), 272 pp.

17. Greniewski, H., "Introduction to Science of Science", Problems of Science of Science. Materials and Studies, Warsaw, v. 2, no. 4, 1966, 192 pp.

18. Jordan, L. F., "Coordinated Planning for Science in Communist Europe", Science, v. 155, February 17, 1967, pp. 796-802.

Council of Economic Mutual Assistance (CEMA) coordinates policy and planning in support of science and technology in Communist Europe; a report on the accomplishments and problems of CEMA.

19. Julius, H. W., "Government-Industry Partnership in Scientific Applications, With Special Reference to the Netherlands", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 31-41.

The development, organization, and objectives of the Central Organization for Applied Scientific Research, "the axis on which turns the Dutch system of government-industry partnership in scientific applications." Discusses the relationships between this organization, government, and science.

20. Kaneshige, K., "Modern Evolution of Science and Technology in Japan", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 43-49.

A review of major Japanese accomplishments in industry and technology, and the role of the government in science and technology.

21. Lardner, G. E. A., "Science and Technology in Africa", Bulletin of the Atomic Scientists, v. 23, no. 6, June 1967, pp. 36-39.

Discusses the fundamental importance of the presence and behavior of the agents of production and distribution, and the trained manpower supply, in economic development, the significance of market research, cost accounting, and management in promoting the demand for innovation; the obstacles to "technology implantation" and other philosophy "enshrined in the aid policy statements of several advanced countries".

22. Lecerf, D., "Major Research and Development Programmes as Instruments of Economic Strategy", Impact of Science on Society, v. 17, no. 2, 1967, pp. 115-134.

Proposes large R&D programs as a vehicle for focusing the limited resources of small, medium, and developing nations on economic and industrial objectives. Outlines the methodology and science policy decisions needed for implementing such programs.

23. Levcik, B., Kekola, J., and Tondl, L., "Criteria of the Development of Research and Scientific Activity", Economic Paper No. 8, Academia, Prague, 1967.

24. Luck, J. M., Science in Switzerland, Columbia University Press, New York (April 1967), 424 pp.

Describes the history and current state of science, including such aspects as education, government interest, facilities for research, and dissemination of information.

25. Major, R., "Science and Technology as Employed in the Development of a National Economy", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 51-57.

Discussion of the pervasive influence of science, the slowness most countries exhibit in developing a national science policy, examples of international cooperation stimulating the creation of science policies, and endeavors of Norway to develop a national policy.

26. Orleans, L. A., "Research and Development in Communist China", Science, v. 157, July 28, 1967, pp. 392-400.

The political and social setting of R&D in Communist China, Soviet and Western influences, the nature and goals of R&D, management and direction, and level of effort.

27. Rudd, E., "Too Many Pure Scientists", New Society, no. 255, August 17, 1967, pp. 215-216.

The need for more applied scientists, the reasons for the shortage, and the brain drain.

28. Solandt, O. M., "Toward a Canadian Science Policy", Chemistry and Industry, Issue 15, April 15, 1967, pp. 604-609.

Outlines a national science policy with emphasis on a small number of fields closely related to national goals and problems; includes a discussion of the role of basic research, universities, industry, and the government.

29. Zaheer, S. H., "Meeting National Needs Through Science and Technology", U. S. House of Representatives, Committee on Science and Astronautics, Washington, D. C., 1967, Paper from "Government, Science, & International Policy", pp. 59-71.

Discusses the "problem of integration of science and technology with society" in India, the organization and management of research, the problems of devising and implementing a national science policy, and presents data on expenditures for R&D.